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Notice of Allowability	Application No.	Applicant(s)	
	09/652,600	MARSCHNER ET AL.	
	Examiner	Art Unit	
	Samuel Broda	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicants' Response dated 23 April 2004.
2. ☒ The allowed claim(s) is/are 18-21 and 47-52.
3. ☒ The drawings filed on 23 April 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

SBroda

**SAMUEL BRODA, ESQ.
PRIMARY EXAMINER**

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1. This communication is in response to Applicants' Response to Office Action Dated March 4, 2004, dated 23 April 2004. Claims 18-21 were amended; claims 1-17 and 22-46 were canceled; claims 47-52 were added. Claims 18-21 and 47-52 are pending.

Reasons for Allowance

2. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) a facial image processing method including illuminating a face using multiple light sources and contemporaneously capturing structure data describing the face's structure and reflectance data describing reflectance properties of the face from the illumination (Yuille et al, "Shape and Albedo from Multiple Images Using Integrability");

(2) a facial image processing method including illuminating a face with illumination and contemporaneously capturing structure data describing the face's structure and reflectance data describing reflectance properties of the face from the illumination using a camera having a polarizer (Debevec et al, "Acquiring the Reflectance Field of Human Face");

(3) a facial image processing method including illuminating a face with illumination using multiple light sources and contemporaneously capturing structure data describing the face's structure and reflectance data describing reflectance properties of the face from the

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illumination (Kriegman et al, "Shape and Enlightenment: Reconstruction and Recognition Under Variable Illumination"); and

(4) an object imaging system that uses polarizing filters over the camera and light source (Bolle et al, U.S. Patent 5,631,976).

2.1 Applicants' first set of claims consists of claims 18 and 47-49.

Independent claim 18 is directed to a facial image processing method. This claim identifies the distinct combination of features of: "illuminating a face with multiple different light sources, wherein at least one of the light sources is polarized", "computing surface normals to the 3-dimensional surface", and "processing the surface normals and the image data to derive an albedo map."

Because the closest prior art does not appear to teach or suggest the combination of processing surface normals and the image data to derive an albedo map of a face by using multiple light sources with at least one source is polarized, claims 18 and 47-49 are deemed allowable.

2.2 Applicants' second set of claims consists of claims 19 and 50.

Independent claim 19 is directed to a facial image processing method. This claim identifies the distinct combination of features of: "illuminating a face with multiple different light sources, wherein all of the light sources are polarized", "computing surface normals to the

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3-dimensional surface", and "processing the surface normals and the image data to derive an albedo map."

Because the closest prior art does not appear to teach or suggest the combination of processing surface normals and the image data to derive an albedo map of a face by using multiple polarized light sources, claims 19 and 50 are deemed allowable.

2.3 Applicants' third set of claims consists of claims 20 and 51.

Independent claim 20 is directed to a facial image processing method. This claim identifies the distinct combination of features of: "applying a generic face template to the range map data to reject noise that is associated with the range map data", "computing surface normals to the 3-dimensional surface", and "processing the surface normals and the image data to derive an albedo map."

Because the closest prior art does not appear to teach or suggest the combination of processing surface normals and the image data to derive an albedo map of a face including the application of a generic face template to reject noise, claims 20 and 51 are deemed allowable.

2.4 Applicants' fourth set of claims consists of claims 21 and 52.

Independent claim 21 is directed to a facial image processing method. This claim identifies the distinct combination of features of: "filtering the range map data", "computing surface normals to the 3-dimensional surface", and "processing the surface normals and the image data to derive an albedo map."

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Because the closest prior art does not appear to teach or suggest the combination of processing surface normals and the image data to derive an albedo map of a face including filtering the range map data, claims 21 and 52 are deemed allowable.

3. Any comments considered necessary by Applicants must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (703) 305-1026. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.



**SAMUEL BRODA, ESQ.
PRIMARY EXAMINER**